Research on Active Learning Classrooms

Scenario

Corbett College has begun converting some classrooms to support active learning. Informed by the institution's own research and a growing body of literature in the field, Corbett sought to create an incubator space that encourages experimentation in pedagogy by faculty from various disciplines. The college's initial effort was to repurpose a computer lab that had fixed tables, a bank of computer towers, and a single AV projector, all focused on an instructor's podium. To make the space more conducive to active learning, staff at Corbett got rid of the tables and computers and installed modular furniture, half a dozen large displays with seating for teams of six students, and whiteboards on every wall. With wired and wireless connectivity, the room's technology is predicated on students and faculty bringing their own devices. The podium is gone, too—instructors and students alike can present from anywhere in the room.

To measure the results of experimentation in the new space, Corbett's instructional designers collaborated with staff from the center for teaching and learning to create assessments, including focus groups with faculty and students. One key lesson has been that no matter how flexible and feature-filled an active learning class might be, making the space work for instructors depends on robust course design and the availability of technical support. A support plan to help instructors use the space proved invaluable in encouraging faculty to use the classroom and experiment with active learning pedagogy. Corbett found that adjustable lighting helped define zones for different kinds of learning tasks and that these classrooms work best when the acoustics are designed to mitigate the sound of conversations among students engaged in collaborative learning. A somewhat counterintuitive finding for such a technology-rich space was that low-tech equipment like round tables and whiteboards can foster group work more than the high-tech provisions.

Reflecting on lessons from this experiment, officials at Corbett recognize that the active learning classroom is starting to spark course redesign and more use of active learning pedagogy—to the extent that demand for active learning classrooms now outstrips supply. Institutional planners have asked for additional funding to meet that demand. They are also sharing what they have learned by developing a paper on effective design for active learning classrooms.

1 What is it?

A regularly cited definition suggests that active learning consists of "instructional activities involving students in doing things and thinking about what they are doing." Research into active learning classrooms (ALCs)—spaces explicitly designed to support and promote this kind of learning and pedagogy—is expanding. This research provides educators with **insights about how best to implement active learning pedagogies and support learners in ALCs**. In addition to raising important questions, the research gives institutions a growing body of evidence on which to base critical decisions about investing time, money, space, and human resources in the development of these classrooms.

2 How does it work?

ALCs are designed to help students work together and to enable faculty to move freely around the room as guides for learning rather than as lecturers. The spaces often have furniture that can be easily reconfigured to accommodate team projects, group problem sets, structured discussions and debates, experiments with manipulables, and various forms of collective presentation. ALCs typically have robust AV/IT capacity, including screen displays linked to one another and to the campus network and the Internet. Studying how pedagogy and physical space can influence each other, **researchers assess how well design elements work and how they affect learning**. A typical study might explore the effects of ALCs on student perceptions and academic performance. Similarly, other studies investigate how faculty members who teach in these classrooms believe the experience changes their pedagogy and effectiveness in nurturing learning. Another branch of the research looks at the physical architecture of classrooms, studying different models for such spaces and, often, comparing them to traditional classrooms. These latter studies often include appraisals of the relative costs of ALCs compared to more traditional classrooms.

3 Who's doing it?

One of the most comprehensive recent studies of active learning classrooms is the book *A Guide to Teaching in Active Learning Classrooms: History, Research, and Practice*. After canvassing foundational research conducted at North Carolina State University, MIT, and the University of Minnesota, **the book reviews**

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the growing literature related to ALCs, essentially setting an agenda for further theoretical and empirical research on their impact. Several important recent studies, including research from the City University of Hong Kong and, separately, from researchers at multiple universities, explore the effects of ALCs on student learning. McGill University maintains a web page that synthesizes information about teaching and learning experiences in ALCs, as does a landing page at Curtin University. An initiative based at North Carolina State University, SCALE-UP (Student-Centered Active Learning Environment for Undergraduate Programs), has inspired active learning development at scores of universities. Oregon State University has initiated a research program studying learner experiences in multiple space types in its new Learning Innovation Center building, several of which are significant experiments to enhance teaching at scale with active pedagogy. The Educational Technology Services group at the University of California at Berkeley published results of a "test kitchen" developed to assess active learning. Researchers at the University of Washington have published findings that active learning increases student performance in science, engineering, and mathematics.

4 Why is it significant?

Teaching practices in higher education have been changing rapidly to include active learning pedagogies that research shows to be effective. Fundamentally, **higher education needs to know why active learning works, how it works best, and how these methods can be adopted more widely**. We need to know more about the impact of ALCs on pedagogy, learning, and student success and retention—whether, for example, students in ALCs learn differently or better or faster than their peers in more traditional classrooms and what pedagogical practices best support active learning. Similarly, we need to understand what environments and features best support active learning. Research on ALCs contributes to deeper inquiries, as well, including adding to the understanding of how people learn. Research on ALCs provides essential data to help institutions make critical financial decisions about space allocation and design, especially given that active learning spaces require more area per seat.

5 What are the downsides?

Isolating the effects of room design on teaching and learning can be exceptionally challenging. Researchers often rely on proxies to measure learning. Many active learning classes enroll too few students for research purposes, and obtaining controlled comparative data can be difficult. Cooperation from faculty may also prove elusive—they might be skeptical about active learning itself, just getting used to it, or concerned that the process of conducting the research will be intrusive in their classrooms. Students and faculty may have preconceptions of what teaching and learning mean (e.g., that "teachers talk and students listen") and may have minimal experience with the different types of interactions that ALCs support. This kind of research can be expensive—e.g., when it engages multiple control groups or is conducted over long periods of time—and funding for such work may be hard to find.

6 Where is it going?

Going forward, research on ALCs is likely to include larger studies and those that investigate the effects of ALCs over longer periods of time. Analysis of the **extensive data available through learning analytics will help evaluate the effectiveness of learning experiences in these spaces**. Given that much of the research to date has focused on the effects of active learning on courses within a relatively narrow range of disciplines, particularly STEM, future research could include a wider range of fields, particularly in the humanities. Further, future research will likely dive deeper into particular dimensions of active learning and ALCs—as, indeed, is suggested by emerging research on classroom acoustics, temperature, and lighting. As more evidence of usage becomes available, more sophisticated analyses will emerge around the cost-effectiveness of ALCs.

7 What are the implications for teaching and learning?

Research that shows the efficacy of ALCs—or, alternatively, that sheds light on how to avoid some of their pitfalls—helps advance the use of such spaces and **informs improvements in the design of learning spaces**. Findings about how space design can encourage more effective learning will challenge faculty members and faculty development experts to adopt active learning pedagogy and help learners engage with and learn from one another, contributing to student success. More broadly, the research findings can also influence curriculum development and instructional design. In those respects, the research challenges higher education to adopt new thinking and can help change longstanding paradigms of pedagogy, learning, and classroom design.